

Chapter 1

INTRODUCTION

BACKGROUND

This report documents the methods and technical criteria used by staff of the South Florida Water Management District (SFWMD or District) to develop minimum flows and levels (MFLs) for the St. Lucie River and Estuary. These MFLs are being developed pursuant to the requirements contained within the Florida Water Resources Act, Sections 373.042 and 373.0421, Florida Statutes (F.S.), as part of comprehensive water resources management actions that are being taken to assure the sustainability of the water resources.

The *District Water Management Plan* for the SFWMD (SFWMD, 2000a) includes a schedule for establishing MFLs for priority water bodies within the District. This list requires that MFLs for the St. Lucie River and Estuary be established by 2001.

The proposed MFLs are not a “stand alone” resource protection tool. They should be considered in conjunction with all other resource protection responsibility granted to the water management districts by law. This includes consumptive use permitting, water shortage management, and water reservations. A model framework identifying the relationships among these tools is discussed in this document and was used in developing the MFLs. In addition, the District has completed regional water supply plans, pursuant to Chapter 373.0361, F.S., that also include recommendations for establishment of minimum flows and recovery and prevention strategies (SFWMD 2000b, 2000c, and 2000d).

Establishing *minimum* flows and levels alone will not be sufficient to maintain a sustainable resource or protect it from significant harm during the broad range of water conditions occurring in the managed system. For the St. Lucie River and Estuary, extended periods of large-volume freshwater flows also impact the resource. Setting a minimum flow is viewed as a starting point to define minimum water needs for sustainability. The necessary hydrologic regime for restoration of the St. Lucie River and Estuary ecosystem must also be defined and implemented through the use of water reservations and other water resource protection tools. Achieving the required water levels throughout this system is an overall, long-term restoration goal (USACE and SFWMD, 1999). *Maximum* flows for the St. Lucie River and Estuary are controlled in part by regulation schedules for Lake Okeechobee and the amounts of water discharged from the following structures: S-80 in the C-44 Canal, S-48 in the C-23 Canal, and S-49 in the C-24 Canal.

As a first formal step to establish MFLs for the St. Lucie River and Estuary, this report includes the following:

- Description of the framework for determining MFLs based on best available information (this approach may be applied to other surface and ground waters within the District)
- Development of a technical methodology and basis for establishing MFLs for the St. Lucie River and Estuary
- Results of an independent scientific peer review conducted pursuant to Section 373.042, F.S.

Rule development workshops will be held to discuss concepts proposed for the St. Lucie River and Estuary. Persons who wish to receive notice of these workshops, as well as any public meetings should notify the District.

PROCESS AND BASIS FOR ESTABLISHMENT OF MINIMUM FLOWS AND LEVELS

Process Steps and Activities

The process for establishing minimum flows for the St. Lucie River and Estuary can be summarized as follows:

1. Through the development of the *Upper East Coast Regional Water Supply Plan* (SFWMD, 1998a), the Indian River Lagoon Feasibility Study (USACE and SFWMD, 2001) and concurrent staff research and analysis, a methodology and technical basis for establishment of the MFLs was developed.
2. An initial draft of the MFL technical criteria document was completed in April 2001.
3. A technical workshop was conducted to review the initial draft and the draft was revised to incorporate comments received from the public and various agencies. A revised draft was released in May 2001.
4. A scientific peer review of the technical documents was conducted during the summer of 2001 to verify the criteria pursuant to Section 373.0421, F.S.
5. Revisions to the MFL report recommended by the panel, as appropriate, were incorporated into the criteria, resulting in this draft, which was released in October 2001.
6. Further public consideration of the technical basis and methodology for establishing the MFLs and review of the first draft of the rule will be conducted during rule development workshops.

7. A final rule draft will be presented to the Governing Board for establishment in December 2001.

LEGAL AND POLICY BASIS FOR ESTABLISHMENT OF MINIMUM FLOWS AND LEVELS

Florida law requires the water management districts to establish MFLs for surface waters and aquifers within their jurisdiction (Section 373.042(1), F.S.). The minimum flow is defined as the "...limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area." The minimum level is defined as the "limit at which further withdrawals would be significantly harmful to the water resources of the area." The statute further directs water management districts to use the best available information in establishing MFLs. Each water management district must also consider, and at its discretion may provide for, the protection of nonconsumptive uses in the establishment of MFLs (Section 373.042, F.S.). In addition, a baseline condition for the protected resource functions must be identified through consideration of changes and structural alterations in the hydrologic system (Section 373.042(1), F.S.).

The following sections outline the legal and policy factors relevant to establishing MFLs under the MFL law. In summary, the following questions are answered:

- What are the priority functions of each water resource and what is the baseline condition for the functions being protected?
- What level of protection for these functions is provided by the MFL standard of protection - significant harm?

Identify Relevant Water Resource Functions

Each surface water body or aquifer serves an array of water resource functions. These functions must be considered when establishing MFLs as a basis for defining significant harm.

The term "water resource" is used throughout Chapter 373. Water resource functions protected under Chapter 373 are broad, as illustrated in Section 373.016, F.S. These functions include flood control, water quality protection, water supply and storage, fish and wildlife protection, navigation, and recreation.

The State Water Resource Implementation Rule, Chapter 62-40.405, Florida Administrative Code (F.A.C.), outlines specific factors to consider, including protection of water resources, natural seasonal changes in water flows or levels, environmental values associated with aquatic and wetland ecology, and water levels in aquifer systems. Other specific considerations include the following:

- Fish and wildlife habitat and the passage of fish
- Maintenance of freshwater storage and supply

- Water quality
- Estuarine resources
- Transfer of detrital material
- Filtration and absorption of nutrients and pollutants
- Sediment loads
- Recreation in and on the water
- Navigation
- Aesthetic and scenic attributes

This policy determination as to which resource functions to consider in establishing MFLs is within the SFWMD Governing Board's purview. This analysis requires a comprehensive look at sustainability of the resource itself as well as its role in sustaining overall regional water resources. **Chapter 3** of the MFL document provides a detailed description of the relevant water resource functions of the St. Lucie River and Estuary.

Identify Considerations and Exclusions: Baseline Conditions to Protect Water Resource Functions

Once the water resource functions to be protected by a specific minimum flow or level have been identified, the baseline resource conditions for assessing significant harm must be identified. Considerations for making this determination are set forth in Section 373.0421(1)(a), F.S., which requires the water management districts, when setting a MFL, to consider changes and structural alterations that have occurred to a water resource. Likewise, Section 373.0421(1)(b), F.S., recognizes that certain water bodies no longer serve their historical function and that recovery of these water bodies to historical conditions may not be feasible. These provisions are discussed in **Chapter 3** and their applicability to the minimum levels that are proposed for the St. Lucie River and Estuary are examined.

Level of Protection for Water Resource Functions Provided by the MFL Standard of Significant Harm

The overall purpose of Chapter 373 is to ensure the sustainability of water resources of the state (Section 373.016, F.S.). To carry out this responsibility, Chapter 373 provides the District with several tools with varying levels of resource protection standards. MFLs are one part in this framework. Determination of the role of MFLs and the protection that they offer, versus the roles played by other water resource tools available to the District, is discussed below.

The scope and context of MFLs protection rests with the definition of significant harm. The following discussion provides some context to the MFLs statute, including the significant harm standard, in relation to other water resource protection statutes.

Sustainability is the umbrella of water resource protection standards (Section 373.016, F.S.). Each water resource protection standard must fit into a statutory niche to achieve this overall goal. Pursuant to Parts II and IV of Chapter 373, surface water management and consumptive use permitting regulatory programs must prevent **harm** to the water resource. Water shortage statutes dictate that permitted water supplies must be restricted from use to prevent **serious harm** to the water resources. Other resource protection tools include reservation of water for fish and wildlife, or health and safety (Section 373.223(3), F.S.), and aquifer zoning to prevent undesirable uses of the ground water (Section 373.036(4)–(5), F.S.). By contrast, MFLs are set at the point at which **significant harm** to the water resources or ecology would occur. The levels of harm cited above - harm, significant harm, and serious harm - are relative resource protection terms. Each plays a role in the ultimate goal of achieving a sustainable water resource.

The conceptual relationships among the terms harm, significant harm, and serious harm proposed by the District are shown in **Figure 1**. The general narrative definition of significant harm proposed by the District (SFWMD, 2000e) for the water resources of an area is as follows:

***Significant harm** is defined as a loss of specific water resource functions resulting from a change in surface water or ground water hydrology that take two or more years to recover.*

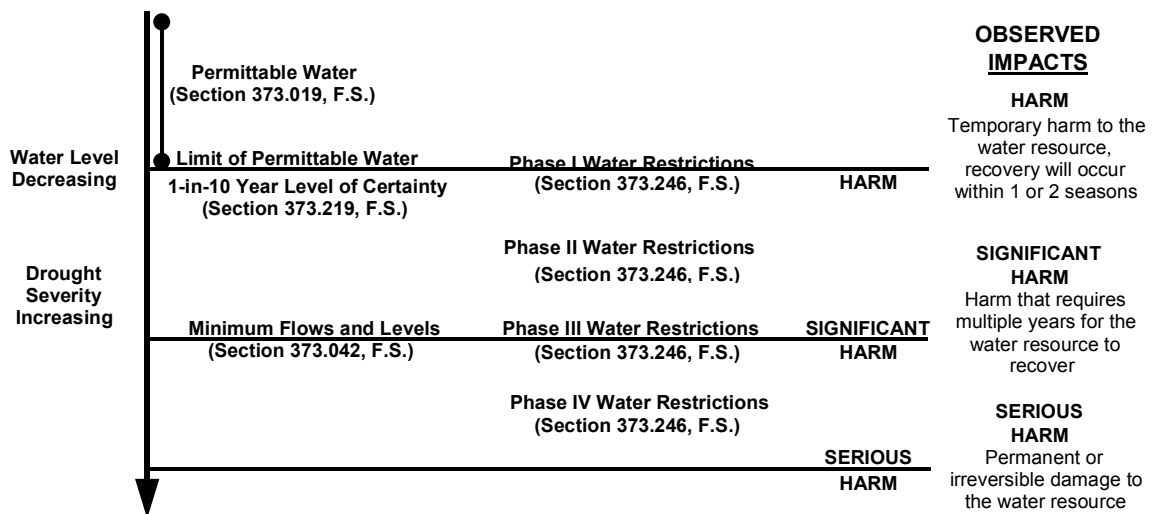


Figure 1. Conceptual Relationships among the Terms *Harm*, *Significant Harm*, and *Serious Harm*

OTHER LEVELS OF HARM CONSIDERED IN FLORIDA STATUTES

A discussion of the other levels of harm identified in the conceptual model for consumptive use permitting and water shortage is provided below to give context to the proposed significant harm standard.

Consumptive Use Permitting Role - Harm Standard

The resource protection criteria used for consumptive use permitting are based on the level of impact that is considered harmful to the water resource. These criteria are applied to various resource functions to establish the range of hydrologic change that can occur without harm. The hydrological criteria include level, duration, and frequency components and are used to define the amount of water that can be allocated from the resource. Saltwater intrusion, wetland drawdown, aquifer mining, and pollution prevention criteria in Chapter 40E-2, F.A.C., define the harm standard for purposes of consumptive use allocation. These harm criteria are applied using climate conditions that represent an assumed level of certainty. The level of certainty used in the *Upper East Coast Water Supply Plan* (SFWMD, 1998a), *Lower East Coast Regional Water Supply Plan* (SFWMD, 2000b), and the *Lower West Coast Water Supply Plan* (SFWMD, 2000c) is a 1-in-10 year drought frequency, as defined in the District's permitting rules. The 1-in-10 year level of certainty is also the water supply planning goal that was established in Section 373.0361, F.S. The standard for harm used in the consumptive use permitting process is considered as the point at which adverse impacts to water resources cannot be restored within a period of one to two years of average rainfall conditions. These short-term adverse impacts are addressed for the Consumptive Use Permitting Program, these permits are issued based on allocations to meet demands for use during relatively mild, dry season events, defined as the 1-in-10 year drought.

Water Shortage Role - Serious Harm Standard

Pursuant to Section 373.246, F.S., water shortage declarations are designed to prevent serious harm from occurring to water resources. Serious harm, the ultimate harm to the water resources contemplated under Chapter 373, F.S., can be interpreted as long-term, irreversible, or permanent impacts. Declaration of water shortages is the tool used by the Governing Board to prevent serious harm. These impacts associated with serious harm occur at drought events that are more severe than the 1-in-10 level of certainty used in the consumptive use permitting criteria.

When drought conditions exist, water users, typically for irrigation or outside use, increase withdrawals to supplement water not provided by rainfall. In general, the more severe the drought, the more supplemental water is needed. These increased withdrawals increase the potential for serious harm to the water resource.

The District has implemented its water shortage authority by restricting consumptive uses based on the concept of equitable distribution between users and the water resources (Chapter 40E-21, F.A.C.). Under this program, different levels or phases of water shortage restrictions are imposed relative to the severity of drought conditions. The four phases of the current water shortage restrictions are based on relative levels of risk posed to resource conditions leading up to serious harm impacts. Under the District's program, Phase I and II water shortages are primarily designed to prevent harm, such as localized, but recoverable, damage to wetlands or short-term inability to maintain water levels needed for restoration. Actions that may be taken include reducing water use through conservation techniques and minor use restrictions, such as car washing and lawn watering. Phases III and IV, however, require use cutbacks that are associated with some level of economic impact to the users, such as agricultural irrigation restrictions.

MFL RECOVERY AND PREVENTION STRATEGY

MFLs are implemented through a multifaceted recovery and prevention strategy, developed pursuant to Section 373.0421(2), F.S. If it is determined that water flows or levels will fall below an established MFL within the next 20 years or that water flows or levels are presently below the MFL, the water management district must develop and implement a recovery or prevention strategy. The twenty-year period should coincide with the regional water supply planning horizon for the subject area and the strategy is to be developed in concert with that planning process. A prevention strategy is recommended for the St. Lucie River and Estuary MFLs.

The general goal of the recovery and prevention strategy is to continue to provide sufficient water supplies for all existing and projected reasonable-beneficial demands, while taking actions to achieve the MFL criteria. If the existing level is below the MFL, recovery to the MFL must be achieved "as soon as practicable." Many different factors will influence the water management district's capability to implement the proposed actions in a timely manner, including funding availability, detail design development, permissibility of regulated actions, land acquisition, and implementation of updated permitting rules.

From a regulatory standpoint, depending on the existing and projected flows or levels, changes to either water shortage triggers, interim consumptive use permit criteria, or both, may be recommended in the recovery and prevention strategy. The approach varies depending on whether the MFL is currently exceeded or not and what is causing it to be exceeded. Causes could include consumptive use withdrawals, poor surface water conveyance facilities or operations, overdrainage, or a combination of these.

Incremental measures to achieve the MFLs must be included in the recovery and prevention strategy, as well as a timetable for the provision of water supplies necessary to meet reasonable-beneficial uses. Such measures include development of additional water supplies and conservation and other efficiency measures. These measures must make water available "concurrent with, to the extent practical, and to offset, reductions in permitted withdrawals, consistent with ...[Chapter 373]." The determination of what is "practical" in

identifying measures to concurrently replace water supplies will likely be made through consideration of economic and technical feasibility of potential options. Additional information about the prevention strategy recommended for the St. Lucie River and Estuary is provided in **Chapter 5**.

DOCUMENT STRUCTURE

Chapter 2 describes the geographic setting, the resources at risk, and the major issues concerning the use and conservation of resources within the St. Lucie River and Estuary. **Chapter 3** documents the resource functions and considerations for technical criteria development. **Chapter 4** presents the methods that were used to establish significant harm criteria and describes the specific hydrologic criteria that were developed to indicate the point at which significant harm occurs. **Chapter 5** includes an analysis of the specific relevant factors and implications of the proposed definition of significant harm. Conclusions and recommendations are presented in **Chapter 6**. The **References** and the glossary follow **Chapter 6**. Technical **Appendices A** through **J** are provided in a separate volume and include more detailed descriptions and analyses of available data, literature, and issues raised during the review process.